

# Preliminary studies on the sulfur isotopes and geochemistry of the urban precipitation in Korea

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Preliminary studies on the seasonal variations in abundance of stable isotopes were carried out on the snow and rainwater samples from urban area. Stable isotopes and other geochemical data as a tool for characterizing the seasonality and source of pollutants were examined in study areas, especially to trace the sources of sulfate in precipitation and to distinguish sulfates of natural and anthropogenic origin.

In this study, sulfate which is regarded as a major candidate causing acid rain and other ions dissolved in precipitation were studied in urban areas (Seoul and Busan), Korea. Precipitation samples have been collected and analyzed from June 2002 to present. The preliminary analysis data show that the  $\delta^{34}\text{S}$  values of sulfate in precipitation range from 2.3 to 6.6‰ (mean 4.73 ‰) in Seoul and from 1.8 to 18.6‰ (mean 8.22 ‰) in Busan. Although sulfates can be originated from many sources including sea spray, biogenic activity, and combustion of fossil fuel, the  $\delta^{34}\text{S}$  value of sulfate in precipitation in Seoul suggests more anthropogenic origin than natural causes compared to Busan area and seems to be dependent on certain meteorological conditions like prevailing wind directions. Most of the sulfates in precipitation from Seoul are evaluated to have derived from industrial areas of southwestern Seoul (Guro, Sihwa, and Ahnyang) in summer. However the  $\delta^{34}\text{S}$  values of sulfate in precipitation in Busan are mainly affected by sea spray because of the continuous contribution of sulfate transported by the wind from the eastern coast. The chemical compositions of the precipitation from Seoul and Busan are also quite different due to the characteristic of these sampling sites. These data were characterized by both natural and anthropogenic activities. The dominant ions are ammonia and sodium in each area during summer. Further data collection is needed to evaluate the seasonal variation of the pollutants reflected in precipitation in the study areas.

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